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Towards oilseeds sufficiency in India: Present status and way forward

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ABSTRACT

India is a global player in edible oil arena, being the 2nd largest importer, and 3rd largest consumer of edible oil as well as 4th largest oilseed producer. Rapeseed and mustard, Soybean and groundnut contribute 82% of total inland oilseed production. Per capita consumption has been increasing and is projected at around 24 kg by 2025. There is a large gap in production and demand of edible oilseeds, leading to growing dependency on import day by day. Productivity of Indian oil seed sector per se is very low that needs to be augmented to save the hard earned foreign exchange. This situation needs revisiting researchable and policy issues adopted so far. This article discusses the current scenario and future strategies to achieve self-sufficiency in Indian oilseed sector.

Keyword: Oilseed, import, production, self-sufficiency, vegetable oil

INTRODUCTION

Vegetable oil is the prime source of fatty acids, which are essential for human nutrition. Oilseed sector plays an important role in agriculture and economy of India (DOR, 2013). Nine oil bearing annual seed crops serve as the major source of edible oil (DRMR, 2015). Among all, soybean, groundnut and rapeseed and mustard are the main contributors. Oilseed crops are cultivated on poor and marginal soils primarily under rainfed situation (Singh *et al.*, 2013; Singh *et al.*, 2014). This has resulted in poor realization of genetic potential of improved varieties/hybrids. India is the 4th largest oilseed producing country in the world after USA, China and Brazil. However, it is the 3rd largest consumer of edible oils (DVVOF, 2017). The country is the second largest importer (9% of total of world) of edible oilseeds after China, and plays a crucial role in the world trade of edible oils (DVVOF, 2017). In terms of vegetable oil, our import accounts for nearly 14% of world vegetable oil. Palm oil import constitutes about 70% of vegetable oil import (Anonymous, 2015). Indian oil seeds sector considers a sum total of nine commodities (seven edible, i.e., soybean, groundnut, rapeseed and mustard, sunflower, sesame, safflower and two non-edible, i.e., castor and linseed). Soybean (39%), groundnut (24 %), rapeseed and mustard (24%) altogether contribute 87% (Table 1) of the total production (DGR, 2015; DRMR, 2015 and DSR, 2015). So far as their contribution to vegetable oil is concerned, rapeseed and mustard tops the list (31%) followed by soybean (26%). Contribution of other 4 crops towards oilseed production and vegetable oil is 13% and 18 %, respectively (DAC, 2017).

Table 1: Share of major oil seed in vegetable oil production in India

Oil bearing annual crops	Share in oilseed (%)	Share in vegetable oil (%)
Soybean	39	26
Groundnut	24	25
Rapeseed and Mustard	24	31
Others	13	18

Present status of vegetable oil sector in India

Projected trend in edible oil consumption by Indian during 2015-2025

FAO (2016) in its projection up to 2025 has estimated that per capita consumption of edible oils in India will have an upward trend. It was attributed to increase in income and change in food habit. According to FAO (2016) estimates, per capita consumption of edible oil was 18.13 kg during 2016-17, which is projected to increase up to 24 kg during 2025 (Fig.1). Keeping in view the large gap in demand and production, this upward surge in consumption needs careful planning and excruciation to meet out the future requirement. Thus oilseed sector needs priority to make the country self-sufficient in vegetable oil sector too.

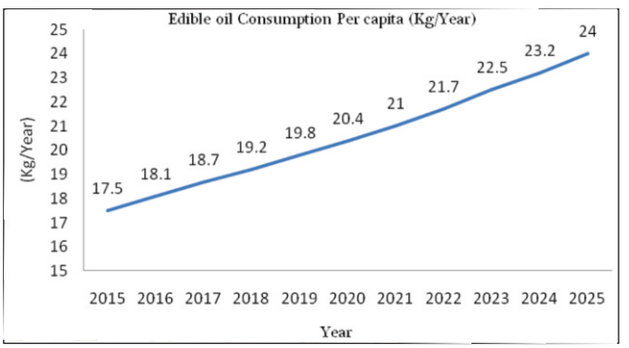

Fig.1: Projection of consumption Per capita (Kg/Year)

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Present status of production and import of vegetable oil in India

From purchasing power point of view, India is the world's third largest economy. This has improved quality of life across the sections of Indian population, and has partially modified our food behaviors, resulting in not only more consumption of quality food, but also fatty substances (Singh et al., 2017). Recent trend in consumption and production forced Indian Government to import oilseeds from world market. Presently, we are the 3rd largest importer of the vegetable oil. There is large gap in inland production and consumption. Data presented in Fig.2 clearly indicates that our vegetable oil production is almost stagnant and range bound, that is, 6.19 and 7.11 Mt during 2009-10 and 2015-16, respectively, whereas the import has maintained its momentum of increase during each year. During the period under report, it increased from 8.82 Mt to 15.50, recorded 175% increase within the period of last 7 years. The case was worst during 2014-15, when the import dependency was 233%.

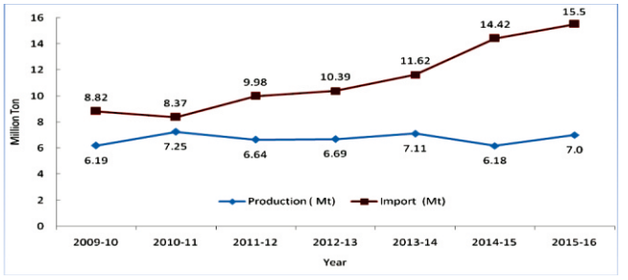

Fig:2: Vegetable oil production and import during 2009-10 to 2015-16

Oilseeds coverage and output in India

Oilseed sector plays a crucial role in Indian economy. Oilseeds share 10% to the total value of all the agricultural commodities. Presently, oilseed crops account for 13% of gross cropped area, majority of which are cultivated under rainfed situation on poor and marginal land. A perusal of Fig. 3 indicates that cropped area under oilseeds cultivation has remained almost the same. It was 26.48 Mha and 26.63 Mha during 2012-13 and 2016-17, respectively. However, output fluctuated heavily (Fig.3); it ranged from 25.2 to 33.6 Mt, respectively during 2015-15 and 2016-17. Such a huge fluctuation (33.3%) is indeed a cause of great concern. .

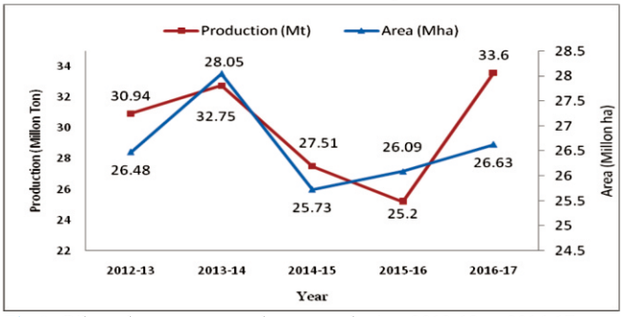

Fig.3: Oil seeds coverage and output during 2012-13 to 2016-17

Oilseeds productivity scenario of India

Fig.3 clearly indicates that area under oilseeds production has remained almost same during the period of analysis; but production was erratic due to several reasons including

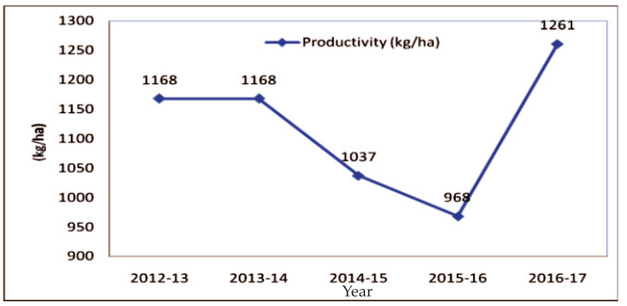

Fig. 4: Productivity of oil seeds during 2012-13 to 2016-17

weather. Almost 70% oilseeds production is dependent on rain based production system. The country witnessed heavy fluctuation oilseed productivity that ranged from 968 kg/ha to 1261kg/ha, respectively during 2015-15 and 2016-17 (Fig.4). Further, our low oilseed productivity compared to other countries is another concern.

Data presented in Table 2 compares the relative position of India vis-à-vis world average and countries with the highest productivity of three major oil producing crops viz. soybean, groundnut, rapeseed and mustard. Soybean productivity is just 36 and 29 per cents of the world average and USA (the global leader), respectively. Likewise in case of groundnut, Indian productivity is just 70 and 28% of world average and highest producer, respectively (USDA, 2017). In case of rapeseed and mustard, similar trend is evident (Table 2). This situation therefore emphasizes that there is urgent need to improve the productivity of all oilseeds crops. Our first goal should be to upscale the oilseeds productivity up to world average and then for the next levels. In case of rape seeds and mustard, Indian productivity is even lower than the Pakistan (USDA, 2017).

Table 2 : Productivity of oil bearing annual crops

Oil seed crops	Average productivity (kg/ha)		
	India	World	Highest in word
Soybean	1.01	2.81	3.50 (USA)
Groundnut	1.15	1.66	4.12 (USA)
Rapeseed and Mustard	1.26	1.97	2.24 (Canada)

Source : USDA, 2017

Booster dose to vegetable oil sector: Needs of hour

There is an urgent need to boost the oilseed sector as above discussion clearly indicates that situation in oil sector is more serious. Indian Government has taken several steps to sustain nutritional security through special emphasis on pulses, the ultimate source of vegetarian protein. However, vegetable oil is also equally important for fatty acid supplements. Our in house oilseed production is unable to cope up with the demand and draining hard earned foreign exchange. The situation in pulse sector is relatively satisfactory. However, a clear picture will emerge if we compare these two food commodities in term of production demand, self-sufficiency and import liabilities, etc.

Production and import of vegetable oil and pulses

Historical data presented in Fig. 5 and Fig. 6 indicates that demand and supply of pulses has been as usual and steady with passage of time (DVVOF, 2017 and DAC, 2017).

However, due to improvement in Indian economy owing to massive reform that started during 1991 and continued by successive government, dramatic change in consumption pattern of edible oils has been observed, leading to mismatch between in-house production and demand driven supply. Fig. 5 reveals that compared to oilseed sector, pulse sector is more balanced. Production of oil is very less in comparison to import, whereas in case of pulses, situation is reverse, that is, production is higher than import. Perusal of results depicted in Fig. 6 accord that dependency on import is more (>50%) in case of vegetable oil as compared to pulses (<27%).

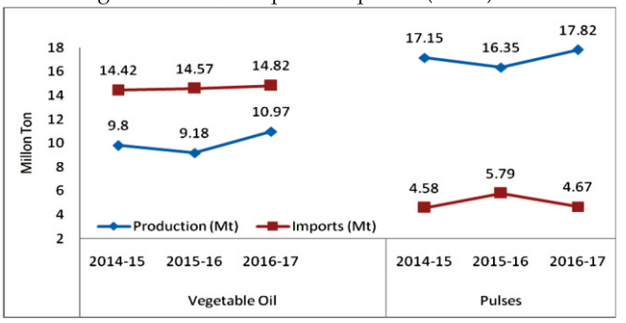

Fig.5: Production and import of Vegetable oil and pulses

Import liability due to import of vegetable oil and pulses

Vegetable oil and pulses are the two major commodities, which merit special attention to transform us into the fully self sufficient nation (DVVOF, 2017 and DAC, 2017). India is almost self-sufficient in cereals (Singh *et al.*, 2017). Hard earned foreign exchange is darning due to increasing import of both the edibles. Perusal of Fig.7 indicates that vegetable oil import liability is increasing day by day. It was 65000 crores in 2014-15 and rose to 95750 crores during 2016-17, recording 47.3% growth in just three years (DVVOF, 2017). However, in case of pulses, it is within the range of 17,063 to 23672 crores with a peak of 25,691 crore (DAC, 2017). The import burden

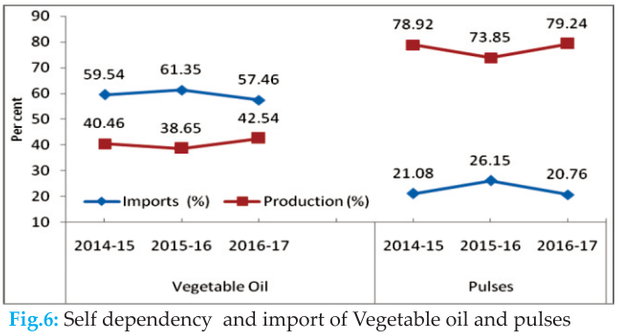

Fig.6: Self dependency and import of Vegetable oil and pulses

ratio by oil sector was the maximum (4.0 times than pulses) during 2016-17; thus it depleted foreign exchange 400 per cent greater than pulses sector. Data presented for imports liabilities are based on dollar- rupees conversion factor and information available in public domain.

Foregone deliberation revealed that edible/vegetable oil sector needs boost. It is worth-mentioning that to achieve self sufficiency in oil seed sector, Technology Mission on Oilseeds was launched in 1986 with an objective to improve production and productivity. However, further impetus is required to address these challenges.

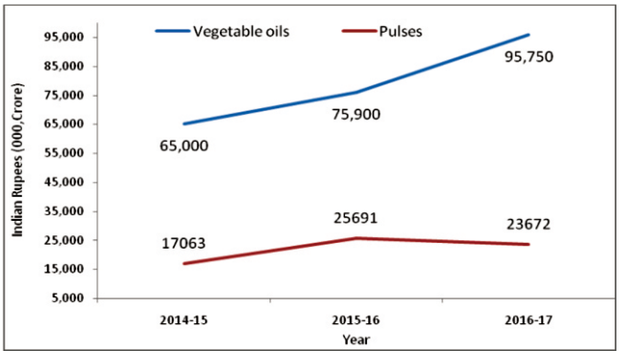

Fig. 7: Indian Import liability (Rs Crore) Average of oilseeds and pulses during 2014-15 to 2016-17

Minimum Support Prices

The Government of India has a mechanism for minimum support price (MSP) to protect the interest of producers (farmers) against any sharp fall in prices of major food comodities. The minimum guaranteed prices are fixed so that market prices cannot fall below this bench mark. The minimum support prices are announced by the Government of India at the beginning of the sowing season for certain crops on the basis of the recommendations of the Commission for agricultural costs and prices (CACP). The MSP presented in Table 3 clearly indicates that there was substantial increase in MSP during 2012-13 over 2011-12. The succeeding increase (2013-14 onwards) was almost nominal. This gives wrong signal to the oilseed growers.

Action Point

Indigenous production of oilseed has been increasing at compound annual growth rate of 3.89%, though it is not sufficient to equate with ever increasing per capita demand (~6%). Immediate matching action is required for vegetable oil sector. Oil sector should not be treated as orphan commodity, since rainfed farmers livelihood is heavily based upon oilseed crops. National Food Security Mission (NFSM) should accord special status to oil seed sector similar to pulses.

Following actions are suggested for boosting oil seed sector of India.

Policy issues

1. Immediate policy intervention from GOI to remove importer nexus from vegetable oil (Oil seed) sector by imposing heavy import duty for raw materials and vegetable oil to boost indigenous oil seed sector.
2. Increasing consumer awareness by differentiating imported and indigenously produced vegetable oils.
3. Minimum support price (MSP) with added bonus or minimum remunerative price (MRP).
4. Crop Insurance/ Guaranteed return of investment on oil seed production.
5. Creation of buffer stock by direct procurement from the farmers at MSP and bonus. This will not only reduce the dependency on import but also bring in self-reliance in oil seed sector.
6. There is need of clear cut policy on the use of genetically

Table 3: Minimum Support Prices for important oilseeds during 2011-12 to 2016-17.

Oilseeds	Minimum Support Prices (Rs/q)					
	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16	2016 -17
Groundnut (pod)	2700	3700	4000	4000	4030	4290
Soybean (Yellow)	1690	2200	2560	2560	2600	2775
Rapeseed n Mustard	2500	3000	3050	3100	3350	3700
Sesame	3400	4200	4500	4600	4700	5000
Safflower	2500	2800	3000	3050	3300	3700
Sunflower	2800	3700	3700	3750	3800	3950

modified (GM) crop, as we are importing 1/3rd i.e. 5.0 Mt of GM oil out of 14.5 Mt of total edible oils import.

7. The NFSM should effectively promote oil seeds crop.
8. All out effort is needed to gain self sufficiency, even more intensively than pulses program.

Enhancing oilseed production and productivity

1. Bringing oilseed revolution in eastern India: The vast availability of natural resources and fertile lands offer ample scope to promote oilseed cultivation in eastern India, including eastern Uttar Pradesh, Bihar, Jharkhand, Odisha, Assam, West Bengal and parts of the North East Hill region in different seasons. The selection of crops and varieties are likely to play the major role in realizing an oilseed revolution in this region. For example, vast area of rice-fallows (about 10 million ha) available in eastern India (Jharkhand, Bihar, Chhattisgarh, Odisha and West Bengal) offers opportunities for expanding area (2-2.5 m ha) of linseed, safflower and rapeseed. A holistic farming system approach would be required for cultivation of oilseed in the rainfed rice-fallows. This includes promoting (a) cultivation of early maturing paddy in the kharif season, so that the fields are vacated early for timely sowing of above oilseed crops, (b) cultivation of the oilseed varieties suitable for rice-fallows (early vigor, early to extra-early maturity, and tolerance to heat stress during reproductive stage), (c) suitable agronomic practices (seed priming, sowing under zero or minimum tillage condition) for ensuring optimum plant population in rainfed rice-fallows, and (d) integrated crop management practices (nutrients, weeds, insect-pests, diseases, etc.).
2. Bringing additional area under oilseeds through intercropping and sequential cropping: Ample scope exists for promotion of oilseeds in intercropping and sequential cropping. Opportunities exist for increasing area of oilseed crops by integrating them in intercropping and sequential cropping. It is possible to have a soyabean-wheat crop rotation, which is very much required for diversifying cereal-based cropping system in northern India. There are several niches for intercropping of soybean with cereals and pulse crops which can be exploited for enhancing area of oilseeds, maximizing profitability and increasing cropping system sustainability. The experiments have shown that the intercropping of soybean with pigeonpea in south India and of rapeseed and mustard with autumn planted sugarcane in north India is very much profitable. These efforts can add up to more than 2 million ha area to the oilseeds.
3. Knowledge empowerment of stakeholders: There has been a slow adoption of improved varieties and production technologies of oilseeds by farmers in several states. Many farmers are still growing decades old varieties and making little or no investments on crop management. In some cases, this is simply because the farmers do not have adequate information about the improved varieties and production technologies. Increase in adoption of improved cultivars and production technologies are very much needed for enhancing yield of oilseeds. This can be achieved by organizing training programs and field days. Farmer participatory trials/demonstrations may be helpful in convincing the farmers the benefit of improved cultivars and production technologies. Distribution of small seed samples (2-5 kg) to large number of farmers would help in rapid spread of new varieties.
4. Expanding area under hybrids of oilseed crops: Commercial hybrids (CMS based) have been developed in sunflower, castor and Indian mustard (NRCHB 506), offering huge potential for enhancing oilseed yield. A large number of demonstrations on farmers' fields have shown that hybrids gave 30 to 40% higher yield than the open pollinated varieties (OPVs). There is a need to make search for CMS source that may be more closely related to the cultivated Indian mustard as the CMS lines from distant source (mori cytoplasm) may have only limited number of restorers (Choudhary and Singh, 2015). Concerted efforts are needed on production of hybrid seed and promotion of hybrids of oilseed crops.
5. Improving access of farmers to seed: One of the major bottlenecks in spread of new varieties is the inadequate availability of quality seed to the farmers at the local level and at the right time. There has been excellent progress in this direction in the recent years and the seed replacement rate (SRR) has increased for oilseeds in almost all the states. However, several old varieties are still in the seed chain. There is a need for enhancing seed availability of new varieties. Seed plans should be developed for each state and the nucleus/breeder seed of these varieties should be produced accordingly. In addition to public seed corporations (NSC and State Seed Corporations), Seed Societies and Private Companies should also be involved in seed production. The conversion of breeder seed to certified seed has to be taken up sincerely. In humid areas, it is difficult for farmers to store seeds for the next season, therefore, good storage facilities should be ensured for keeping

seeds, similar to cold storage facilities availability for potatoes in India.

6. Honeybees rearing for enhancing yield: Some oilseed crops (e.g., sunflower, Indian mustard, etc) are completely or partially cross-pollinated due to complete or weak self-incompatibility, respectively. In such crops, honeybees are pollinating agents. Rearing honeybees (4-5 hives/ha) has been observed to substantially enhance seed setting. Besides, this also generates additional income to farmers. Therefore, honeybees rearing should be advocated for increasing yield of such oilseed crops.
7. Promotion of micro-irrigation: Oilseeds are largely grown under rainfed conditions, and moisture stress leads to a reduction in productivity. In Indian mustard, up to 37.5% reduction in seed yield has been observed due to moisture stress (Singh and Choudhary, 2003). Sub-optimal moisture in the soil at the time of sowing leads to poor germination and plant stand. Greater emphasis should be given to water conservation so that the oilseed crops could receive required number of irrigations. Water saving irrigation methods, such as sprinkler and drip irrigation should be promoted.
8. Integrated nutrient management: Proper nutrient management based on soil analysis is important for harnessing the yield potential of improved varieties/hybrids of oilseed crops. The farmers generally provide only major nutrients like nitrogen (N), phosphorus (P), and in some cases Potash (K). The secondary nutrients, such as sulphur (S) and the micronutrients, such as zinc (Zn), boron (B) and molybdenum (Mo) are ignored. The experiments conducted suggested that application of each of these nutrients can increase yield of oilseed crops in the range of 10 to 25% depending on the extent of deficiency. This calls for developing a soil map for availability of nutrients for each state and recommending application of nutrients accordingly. It is also important to ensure availability of the fertilizers/micronutrients to the farmers at the local level and at the right time.
9. Enhancing mechanization of oilseed cultivation: Increasing mechanization is important for making the oilseed cultivation more profitable and attractive to farmers. One of the keys to success for production of cereals has been mechanization of farm operations. Now, the cultivation of wheat and rice is mostly mechanized. Even the farmers with smallholdings could afford mechanization because of the availability of farm implements on custom hiring. Mechanization would play a key role in modernization of agriculture due to its benefits of improved labour efficiency and productivity, efficient use of expensive farm inputs, reduction of human drudgery and timeliness of operations. Line sowing by seed drills or ridge maker-come-planters should be promoted in the states where farmers are still using seed broad casting for sowing. Harvesting by combine harvesters should be promoted for the crops where suitable varieties are available.

CONCLUSION

Technology Mission on Oilseeds (TMO) made satisfactory progress and import of oilseeds almost stopped on short term basis. However, the country again became a net importer due to static oilseed production and several unfriendly policy decisions. It is high time to support oilseed producing farmers through remunerative price coupled with incentives. This will promote adoption of improved varieties and associated production technologies to make the country self-reliant in oilseed production. Furthermore, large investments in research and extension, long-term planning and execution are required towards long-term sustainability of the oilseed sector in India.

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